
University of Guam Sea Grant Program Strategic Plan 2018-2021



February 8, 2017

Table of Contents

| | |
|--|----|
| Plan Summary | 1 |
| About Guam | 1 |
| About the University of Guam..... | 2 |
| About the University of Guam Sea Grant Program..... | 3 |
| Vision | 3 |
| Mission..... | 3 |
| Core Values | 4 |
| Cross Cutting Principles – Partnerships, Diversity, and Inclusion..... | 4 |
| Leadership and Management | 4 |
| Stakeholder Input and Advisory Board..... | 5 |
| Outline of the Program’s Planning Process..... | 5 |
| UOG Sea Grant’s Strategic Focus Areas in the 2018-2021 Omnibus..... | 5 |
| 1. Healthy Coastal Ecosystems | 5 |
| 2. Environmental Literacy and Workforce Development | 7 |
| Additional Activities for Consideration | 10 |
| 1. Supporting Sea Grant’s International Efforts..... | 10 |
| 2. Marianas Trench National Monument | 10 |
| 3. World Heritage List..... | 10 |
| 4. Marine Protected Areas..... | 10 |
| 5. Aquaculture Development..... | 11 |
| UOG Sea Grant Listening Session | 12 |

University of Guam Sea Grant Strategic Program Plan 2018-2021

Plan Summary

The University of Guam Sea Grant Program (UOGSG) is the youngest and smallest (by funding) program in the Sea Grant family of 33. UOGSG serves the people of the Island of Guam and often assists with neighboring U.S.-affiliated Pacific Islands on issues within Sea Grant's purview. At the moment, UOGSG is in the last 15 months of its current Omnibus and the organization has undergone significant changes in leadership and front-line employees in the last 24 months. A clearer focus has emerged and with the results of an August 2016 stakeholder listening session, and with feedback from our Program Officer, UOGSG proposes to focus on only two of the National Sea Grant's focus areas in the next Omnibus: Healthy Coastal Ecosystems and Environmental Literacy and Workforce Development. Activities are proposed here at a higher level and then in the new UOGSG Omnibus, more granular plans will be provided. In a separate Excel file is the National Sea Grant Performance Measures, Metrics, and Targets for 2018-2021.

About Guam

Guam is an Unincorporated Territory of the United States of America (U.S.), with a population of approximately 165,000 people. Guam serves as the transportation, communication, education and economic hub for the Western Pacific region (Guam Census, 2010). The Western Pacific region extends over an area in excess of 2.5 million square miles (including only E.E.Z., not interconnected waters) and is comprised of more than 2,200 islands from the following political entities: Commonwealth of the Northern Mariana Islands (C.N.M.I.), the Republic of Palau, the Republic of the Marshall Islands, and the Federated States of Micronesia (F.S.M.).

At 32 miles in length, four to eight miles wide and having roughly 151 miles of beaches and cliff lines, Guam is the largest and most populated island in the Mariana Archipelago with a current population of ~165,000 residents residing in 19 villages.



Source: Maps.com

The people of Guam are multicultural and multilingual. The native inhabitants of Guam are Chamorro and the two official languages are English and Chamorro. There are no ethnic majorities, although 42% are Chamorro, 26% Filipino, 13% other Asian ethnicities, 8% Micronesian (from the F.S.M., Palau, or Marshall Islands) and 7% are Caucasian.

Prior to 1950, Guam was under United States naval rule, but the Guam Organic Act of 1950 (48 U.S.C. § 1421 et seq.) transferred federal jurisdiction from the Navy to civilian governance with executive, legislative, and judicial branches. Similar to the U.S. Virgin Islands, Guam's only congressional representation is a non-voting delegate to the U.S. House of Representatives, Madeleine Z. Bordallo. Like many U.S. states, there is an elected governor, Eddie Baza Calvo, and a unicameral legislature of 15 senators elected island-wide. Mayors oversee the 19 villages, while lawmaking authority resides exclusively in the hands of the Legislature and the Governor. The judiciary is composed of the Guam Supreme Court and the Guam Superior Court.

The entire island of Guam has been locally and federally designated as a coastal zone, containing 19 watersheds in the southern half of the island and an aquifer in the north of the island (DAWR, 2006). The northern half of the island is a volcanic rock covered by a Pleistocene limestone plateau, which rises nearly 200 meters above sea level in some places (Burdick et al 2008). In contrast, the southern half of the island is weathered volcanic clay with scattered limestone outcrops. The highest point of the island is Mt. Lam Lam in the south, and rises to an elevation of 406 m. Grasslands and ravine forests characterize the vegetation in the south (DAWR, 2006).

In addition to comparisons among shallow coastal waters, Guam and the Mariana Islands feature a wide variety of unique ocean assets. This area encompasses the nation's largest pelagic fishery, true atolls, and the greatest marine diversity recorded for any area of comparable size (Paulay, 2003). The Western Pacific waters are some of the least spoiled places left on the planet, and most retain considerable conservation potential, including the submarine volcanoes lying along the Mariana Archipelago, the Mariana Trench, the Jellyfish Lakes of Palau, and the world's first (Palau) and largest (R.M.I.) shark sanctuaries. Each of these ecosystems host a mosaic of habitats and a myriad of species found nowhere else on Earth, and yet, ironically the anthropogenic effects of global climate variability, pollution, and environmental degradation also profoundly impact them. Ever since the first Chamorro inhabitants made the Mariana Islands their home, sustainability, and environmental literacy were critical mandates for survival – the archeological and historical record, which spans over four millennia, clearly illustrates these cultural achievements.

The major employer on the island is the Government of Guam, employing nearly 12,000 workers. The economy is intimately tied to Asian markets, driven by tourism, transportation, and the military, and to a lesser extent, by real estate and construction. As part of a global reallocation of U.S. armed forces, significant military resources will shift to Guam (expected direct investment of \$15 billion over 10 years), which is forecast to dramatically boost Guam's economic growth over the next 10 years (Economic Forecast, First Hawaiian Bank, 2006-2007). Guam faces unprecedented challenges, being on the threshold of a Department of Defense build-up that will put significant pressure upon our existing infrastructure and the sensitivity of our natural environments (UOGSG Coherent Area Program application circa 2012. Citations contained in that document).

About the University of Guam

The University of Guam (UOG) is a public, open admissions, four-year, land grant, sea grant, and space grant institution located on the island of Guam, the southernmost island in Mariana Islands chain (see location on map above). Founded in the early 1950's as the College of Guam, the university was first accredited as the University of Guam in 1968. Consistent with this long history, the university has general degree approval for bachelor's and master's degrees. A nine-member Board of Regents (BOR) governs UOG. Under the guidance of BOR policy and Guam law, ongoing planning and decision making is realized through a strong partnership between the administration and the faculty senate.

Serving students mainly from the islands of Guam and Micronesia, UOG offers 34 bachelor's degrees and 14 master's degrees to over 4,000 students, through its single campus in the village of Mangilao on Guam, two online master's degrees, and an offsite location at the College of Micronesia - Federated States of Micronesia. Its business administration, education, nursing, and social work programs are programmatically accredited, respectively, by the International Assembly for Collegiate Business Education (IACBE), the Council for the Accreditation of Educator Preparation (CAEP, formerly NCATE), the Accreditation Commission for Education in Nursing, Inc. (ACEN, formerly NLNAC), and the Council on Social Work Education (CSWE).

The vast majority of UOG's students are undergraduates (95% by FTE), who enroll as freshmen rather than transfers (~ 3% of undergraduates). Nearly three quarters of UOG students are full time (74%, as of fall 2014). The student body reflects the region the university serves; 49% are Pacific Islanders (Chamorro, Micronesian, and Marshallese) and 42% Asian. According to the university, many of its undergraduates are first generation and 75% receive financial aid, with 59% on Pell grants. Since 2004, UOG's enrollments generally have steadily increased, with UOG's 2016 headcount of over 4,000 the largest in its history.

UOG's mission, *Ina, Diskubre, Setbe* (to Enlighten, to Discover, to Serve), is delivered by the equivalent of a 174 full time faculty members (FTF), 138 (79%) of whom are tenured or tenure track and 36 (21%) non-tenure track, together with 744 staff, and 34 administrators. UOG's academic programs are administered through two academic colleges, the College of Liberal Arts and Social Sciences (CLASS) and the College of Natural and Applied Sciences (CNAS), and three professional schools, Business and Public Administration, Education, and Nursing and Health Sciences. UOG also supports eight research units, the faculty of which contribute primarily to graduate education: Cancer Research Center; Center of Excellence in Developmental Disabilities Education, Research and Service; Center for Island Sustainability; Micronesian Area Research Center; Water and Environmental Research Institute; Western Pacific Tropical Research Center; and the Marine Laboratory.

UOG takes very seriously its status as a land grant university and its mission to serve the region, focusing its education, research, and service contributions on issues and challenges specific to Guam and Micronesia, including its indigenous Pacific Islander populations. In support of this commitment, in 2012-13, the university initiated Good to Great (G2G), a comprehensive mission-based self-examination to find the "proper connection between resources and quality, relationships and mission." The intention was to create "a great university that is regionally responsive, fiscally responsible, and a model for higher education in the region" in light of the conditions and challenges the university faces in the coming five to ten years. Central to this effort has been a comprehensive, data driven, program evaluation process through which all 65 academic programs and 30 administrative units were assessed and ranked according to four evaluation criteria: (1) Fit to a Great UOG, (2) Sustainability, (3) Quality, and (4) Demand and Relationships. (Source: WASC review report, June, 2016)

About the University of Guam Sea Grant Program

The University of Guam Sea Grant (UOGSG) has been a *Coherent Area Program* since February 2012 with the formal program establishment at UOG in August 2008. Prior to that it was a *Project* starting in October 2004 and had a *Pre-Extension Program* starting in October 2000. There are hopes that one day UOGSG will obtain *Institutional Status*.

Our **vision** is *a future where people live, work, and play along our coasts in harmony with the natural resources that attract and sustain them.*

Our **mission** is *to apply research, extension, and education activities that sustain and develop island environments while integrating the knowledge and culture of island people.*

Our **core values** are:

- A respect for scientific principles
- A respect for our many cultures and traditional knowledge
- Integrity in all we do
- Enjoying and having fun in the process of education, learning, and research

Cross Cutting Principles – Partnerships, Diversity, and Inclusion

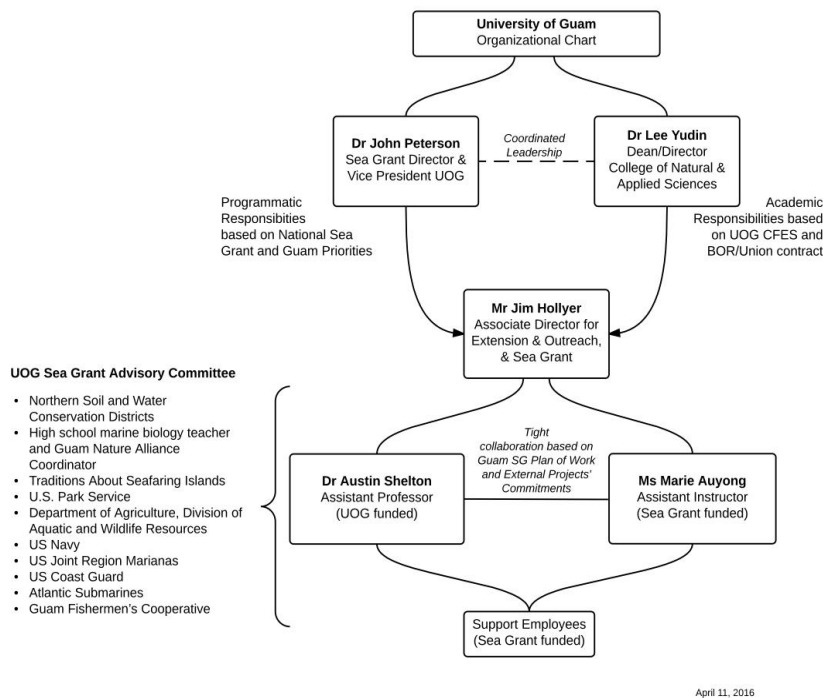
Guam is a small island peopled with citizens from the island, the Philippines, the Federated States of Micronesia, the Contiguous U.S. states (including military), and other places of the world. There are no ethnic majorities, although 42% are Chamorro, 26% Filipino, 13% other Asian ethnicities, 8% Micronesian (from the F.S.M., Palau, or Marshall Islands) and 7% are Caucasian. By its very nature, diversity is part of everyday life on Guam. The citizens and students we serve, the people we employ, the interns we engage, and the volunteers on our Advisory Board represent the people of Guam. And, as stated previously, our Sea Grant program is small and as such we can only get our work done by the partnerships and cooperation of local and federal agencies, village mayors, citizens, colleagues at the University of Guam and Guam Community College, and volunteers.

We have recently undergone a refresh in program leadership and front line employees that will give UOGSG a more precise focus and more measurable outcomes and impacts.

Leadership and Management

Our program is small at present. Employees have their academic loci in the University of Guam’s College of Natural & Applied Sciences (CNAS) and program leadership in the Office of Sponsored Programs (OSP). The diagram below illustrates the 2016 operational structure of UOGSG.

University of Guam Sea Grant Program



Stakeholder Input and Advisory Board

We communicate at least twice a year with our Advisory Board, which is made up of a broad group of stakeholders, as seen from this list:

- Atlantis Submarines
- Guam Department of Agriculture, Division of Aquatic and Wildlife Resources
- Guam Fishermen's Cooperative
- Guam Nature Alliance Coordinator and a high school marine biology teacher
- Northern Soil and Water Conservation Districts
- Traditions About Seafaring Islands (TASI)
- U.S. Coast Guard
- U.S. Joint Region Marianas
- U.S. Navy
- U.S. Park Service

Naturally, this group can generate more ideas than there is funding to support, so this year we hosted a listening session on August 30, 2016 to brainstorm a large list of possible work projects that ALL groups might be able to address. From this list, found in the Appendix, we have chosen a few efforts to close out our existing Omnibus (last 15 months), and have narrowed our strategic focus to a small list of manageable areas with projects to be determined in our Plan of Work.

Outline of the Program's Planning Process

University of Guam Sea Grant got feedback from a program review in February 2015. That information coupled with a stakeholder listening session on August 30, 2016 and with the experiences of our new core employees, helped shape the framework of this strategic plan. UOGSG is a small program with limited resources so care was taken to only address issues that were manageable based on budget and employee time and expertise.

UOG Sea Grant's Strategic Focus Areas in the 2018-2021 Omnibus

University of Guam Sea Grant is currently funded at \$1.2 million over a four-year period (\$255,000/yr). We also have a legislative-mandated waiver of match to \$250,000 that we are partially using. Our program is the newest and smallest in the Sea Grant family and therefore we plan to keep our efforts right-sized for our budget and capabilities. Of the \$255,000 we receive each year, about 74 percent is allocated to salaries and indirect costs in Year 4 of the current UOGSG Omnibus; thus not a lot of extra operational funds. In addition, many of the potential collaborators on Guam are federally funded, rather than Guam-funded. As such, our ability to leverage non-federal dollars in work partnerships is somewhat limited. Given these realities, we have been advised by our National Program Leader to stay with one, or two, of the National Sea Grant focus areas and therefore we are choosing *Healthy Coastal Ecosystems* and *Environmental Literacy and Workforce Development*. We were also advised to keep work descriptions at a fairly high resolution and we have done so. Below is a description of the types of work we will do in these areas and where they fit into the National Sea Grant Strategic Plan for 2018-2021. Also included are possible projects that UOGSG might be able to assist on, but no commitments are being made at this time. Activities are proposed here at a higher level and then in the new UOGSG Omnibus, more granular plans will be provided.

1. Healthy Coastal Ecosystems

The entire island of Guam is both locally and federally designated as a coastal zone. Healthy coastal ecosystems are largely dependent on responsible land-use activities. The northern half of the island is made of limestone, and there are no standing streams. Pollutants including sediment, fertilizers, pesticides, and hydrocarbons often travel into waterways. In some areas, stormwater runoff flows directly from roads and other impervious surfaces into ocean outlets without first entering ponding basins or filtration systems. The southern half of the island is comprised of 19 watersheds with volcanic soils and dozens of running streams and rivers. The main environmental concern in southern Guam is accelerated

terrestrial erosion, which is caused by poor development practices, wildland arson, uprooting of vegetation by feral ungulates, and irresponsible usage of recreational off-road vehicles. There are 8,908 acres of high priority planting areas in southern and central Guam that include bare ‘badland’ sites where topsoil and nutrients have completely eroded away (Mafnas, 2010). Land-based pollutants entering the ocean adversely affect the growth, survival, reproduction, and recruitment of corals in coastal coral reefs. The Guam Restoration of Watersheds (GROW) Project is a core initiative of UOGSG using research to develop new watershed restoration techniques with the potential for quick and wide-scale application. The GROW Project will also test methods to filter pollutants out of stormwater runoff. The tie-in to the National Sea Grant Strategic Plan is:

| Focus Area: Healthy Coastal Ecosystems | | UOGSG Activities |
|---|--|---|
| <i>GOAL: Habitat, ecosystems, and the services they provide are protected, enhanced, and/or restored.</i> | | |
| <ul style="list-style-type: none"> o ACTION: Develop and share scientific understanding, decision-support tools, technologies, and approaches to protect and restore ecosystems. | - DESIRED OUTCOME: Scientific understanding and technological solutions inform and improve conservation and the management of natural resources. | Conduct UOGSG-funded and directed applied research on local natural resource conservation and management challenges |
| | - DESIRED OUTCOME: Ecosystem science and conservation priorities developed through stakeholder participation are addressed. | <ul style="list-style-type: none"> • Include select research topics on UOGSG research agenda (GROW) and RFPs from 2016 UOGSG Listening Session • Schedule stakeholder meetings to set priorities for future research topics |
| | - DESIRED OUTCOME: Greater awareness and understanding of ecosystem functions and services they provide improves stewardship efforts. | Disseminate UOGSG-sponsored data, tools, and publication through website and other outlets as appropriate to audience demographic |
| <ul style="list-style-type: none"> o ACTION: Sustain the habitat, the biodiversity, and the abundance of coastal ecosystems, fish, wildlife, and plants. | - DESIRED OUTCOME: Declining biodiversity, habitats, and ecosystem functions and services are restored and sustained. | Develop and test tools for habitat restoration, improvement of ecosystem functions and services |
| | - DESIRED OUTCOME: Improved collaborative planning and decision-making leads to enhanced stewardship. | Participate in interagency work groups (i.e., Government of Guam-led Assembly of Planners, Coral Reef Local Action Strategy working groups) |

GOAL: Land, water, and living resources are managed by applying sound science, tools, and services to sustain ecosystems.

| | | |
|--|---|---|
| <p>o ACTION: Support a sound science- and management-driven framework that integrates observations, monitoring, research, and modeling to provide a scientific basis for informed decision-making.</p> | <p>- DESIRED OUTCOME: Collaborations with partners and stakeholders support planning, research and technological solutions to address resource management needs.</p> | <ul style="list-style-type: none"> • Participate in interagency work groups (i.e., Government of Guam-led Assembly of Planners, Coral Reef Local Action Strategy working groups) • Leverage research at multiple UOG institutes with UOGSG funds or other resources |
| | <p>- DESIRED OUTCOME: Citizen science initiatives are engaged and contribute to improving our knowledge with respect to coastal communities and ecosystems.</p> | <p>Develop citizen science initiatives through UOGSG and collaboration with EPSCoR, UOG Center for Island Sustainability</p> |
| | <p>--DESIRED OUTCOME: Communities have access to sound science, data, tools, and the training to be effective in planning and decision-making processes.</p> | <p>Disseminate UOGSG-sponsored data, tools, and publication through website and other outlets as appropriate to audience demographic</p> |
| | <p>- DESIRED OUTCOME: Resource managers understand the risks, the options, tradeoffs, and impacts of their decisions.</p> | <p>Provide technical assistance to resource managers through extension activities and participation in interagency work groups</p> |
| <p>ACTION: Identify and promote case studies and strategies that enhance resilient ecosystems and watersheds in the context of changing conditions.</p> | <p>- DESIRED OUTCOME: Communities have access to information and understand projected changes within coastal ecosystems and how changes will impact coastal ecosystems.</p> | <p>Disseminate curated collection of coastal ecosystem scientific literature, case studies, and extension guides through appropriate outlets</p> |
| | <p>- DESIRED OUTCOME: Communities can access case studies, training and tools to improve their ability to plan, prepare and adapt to future ecosystem conditions.</p> | |

2. Environmental Literacy and Workforce Development

Global impacts include sea level rise, increasing frequency and intensity of storms, and warmer sea surface temperatures. Island communities can build resilience to these impacts by reducing local environmental stressors, assessing vulnerability, and planning adaptation strategies. A series of extension workshops will transmit coastal science to the local community in a useful and usable format. Extension activities will include climate change vulnerability and disaster preparedness projects. UOG Sea Grant staff will participate as facilitators and recorders in community meetings for the UOG-Office of the Governor of Guam Climate Change Vulnerability study funded by Office of Insular Areas, Department of the Interior. These meetings are a major component of the first vulnerability-resilience planning for Guam and UOG Sea Grant will have significant outreach collaboration with the undertaking. UOG Sea Grant will continue disaster preparedness (e.g., tsunami, typhoons) activities, expanding the distribution of the Sea Grant funded *Mariana Islands Homeowner's Handbook* as well as coordinating workshops.

UOG Sea Grant will provide important coastal science and resource information to the Guam tourism industry as it plans to welcome a large increase in visitors to the island. In 2014, the Guam Visitors Bureau released its *Tourism 2020* strategic plan with a primary goal of increasing tourist arrivals from 1.3 million in 2012 to 2 million by 2020. The plan identifies major opportunities for industry growth in ecotourism and the cruise market, aspires to implement a business improvement district modeled on the Waikiki Improvement District, and projects the addition of 1,640 hotel rooms, or a 20% growth in overall room inventory. Comprehensively, this information indicates that UOG Sea Grant is extremely well positioned to be the primary coordinator for the delivery of science-based information about coastal resources, in relationship to the tourism industry. UOG Sea Grant will interpret scientific and socioeconomic information about coastal resources for government and commercial tourism industry stakeholders, with the long-term goal of establishing viable models for sustainable tourism and development practices on Guam.

Focus Area: Environmental Literacy and Workforce Development

GOAL: An environmentally literate public that is informed by lifelong formal and informal opportunities that reflect the range of diversity of our communities.

| | | |
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| <p>o ACTION: Enable the public to engage in community planning processes with respect to adaptive management to changing conditions by providing the best available information.</p> | <p>- DESIRED OUTCOME: Communities are knowledgeable and equipped with the best available science and technology in order to contribute to adaptive management planning processes and stewardship.</p> | <ul style="list-style-type: none"> • Implement science-based extension activities (i.e. workshops, field trips) on locally significant coastal resource topics (i.e., changing coastline adaptations for homeowners) • Produce culturally competent and appropriate extension education materials (i.e. factsheets, apps, outreaches) |
| <p>o ACTION: Increase effective environmental literacy instruction for K-12 students by formal and informal educators.</p> | <p>- DESIRED OUTCOME: Teachers and students are better informed in science, technology, engineering, and mathematics fields and can employ their knowledge to support sustainable practices within their communities.</p> | <ul style="list-style-type: none"> • Deliver STEM presentations to students and teachers • Participate in local science fair coordination, mentoring, and judging |
| <p>o ACTION: Increase effective environmental literacy communication to stakeholders, including how ecosystem change affects economic, social, and cultural values, as well as implications for conservation and management.</p> | <p>- DESIRED OUTCOME: Stakeholders develop a sense of awareness, understanding and stewardship in order to sustain watershed, coastal, and marine ecosystems and resources.</p> | <ul style="list-style-type: none"> • Implement science-based workshops and activities (i.e. workshops, field trips) on locally significant coastal resource topics (i.e., changing coastline adaptations for homeowners) • Produce culturally competent and appropriate extension education materials (i.e. factsheets, apps, outreaches) |
| | <p>- DESIRED OUTCOME: Communities implement sustainable strategies when managing natural resources and make decisions based on information acquired through informal science education.</p> | <p>Collaborate on agenda-setting and implementation of the annual UOG Regional Conference on Island Sustainability</p> |

GOAL: A diverse and skilled workforce is engaged and enabled to address critical local, regional, and national needs.

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| <p>o ACTION: Grow awareness among the nation's diverse population of career paths that support the needs of the nation's coastal communities.</p> | <p>- DESIRED OUTCOME: All members of a community are enabled to explore and pursue the variety of occupations that are essential to sustain the nation's coastal communities and ecosystems.</p> | <p>Implement science-based workshops, activities, and learning opportunities that promote or educate about occupations related of the coastal sciences (i.e. workshops, field trips)</p> |
| <p>o ACTION: Increase opportunities for undergraduate and graduate students to gain knowledge and experience in the science and management of watershed, coastal, and marine resources.</p> | <p>- DESIRED OUTCOME: College level courses and internships provide increased literacy, experience, and preparedness in areas of watershed, coastal, and marine ecosystems for all students, particularly those from underrepresented groups.</p> | <ul style="list-style-type: none"> • Connect college students with external research experiences and internship opportunities • Fund student research, internships, and other development opportunities targeting underserved populations in coastal science or resource management fields • Mentor and advise students |
| | <p>- DESIRED OUTCOME: Undergraduate and graduate students, particularly those from underrepresented groups, are supported and have access to formal and experiential learning, training, and research experiences.</p> | <ul style="list-style-type: none"> • Implement authentic STEM learning experiences, mentorship through graduate fellowships and undergraduate student worker and internship positions targeting underserved populations • Train students in extension and outreach skills • Connect students to research experiences and conferences through National SG network • Participate in professional groups and networks that promote the advancement of underserved populations in STEM fields |
| <p>o ACTION: Prepare a responsive and diverse workforce to advance and benefit from sectors that support the needs of the nation's coastal communities and ecosystems (e.g. industry, research, government, etc.), and to adapt and thrive in changing conditions.</p> | <p>- DESIRED OUTCOME: Employment in all sectors of the U.S. coastal resource enterprise expands and diversifies.</p> | <p>Engage local businesses in sustainable management of coastal resources through stakeholder needs assessments and participation in regularly scheduled meetings</p> |
| | <p>- DESIRED OUTCOME: The existing and future workforce is able to adapt and thrive in changing environmental, social, and economic conditions.</p> | <ul style="list-style-type: none"> • Provide professional development resources and opportunities for UOGSG-affiliated collaborators and clients (including students) • Participate in career development events (i.e. career day, science fair, educator symposia) |

Additional Activities for Consideration

As a normal course of action, we plan to put most of our energy into our two defined Sea Grant focus areas. There may be times, however, when a little bit of our time and expertise can result in a positive contribution to projects where we are not taking a leading role. These projects could be:

1. Supporting Sea Grant's International Efforts

In addition, and as appropriate, UOGSG may assist the National Sea Grant office with collaborating Sea Grant programs in the Asia region. These may include the current programs in South Korea and Japan, and future programs in Indonesia and the Philippines. Guam is within four hours of most east and southeast Asian capital cities and is very well positioned for the strategic expansion of Sea Grant programs in the region. We propose to make initial contacts in coordination with the International Programs Division of NOAA, Sea Grant leadership in NOAA, University of Hawaii Sea Grant, and the WESTPAC IOC organization to promote exchanges and mutual support for these international programs.

2. Marianas Trench National Monument

The Monument was designated for an expansive area of the western Pacific and incorporates many of the islands and coastal zones of Guam and the Mariana Islands. This region will have enhanced protection status, and the Monument, the National Park Service, regional stakeholders, and partners will have a significant opportunity to participate in the planning and protection of the Monument. However, the process is poorly developed and underfunded. UOGSG can become engaged to help facilitate the Monument through public awareness, public meetings, and coordination with the cognizant federal agencies including National Park Service and U.S. Fish and Wildlife Service. This will be a cross-boundary process involving C.N.M.I., Guam, and international oceans organizations including Global Island Partnership, Secretariat of the Pacific Regional Environment Programme, Secretariat of the Pacific Community, Global Island Partnership, The Nature Conservancy, among others.

3. World Heritage List

The Marianas Trench was recently added to the tentative list of US-ICOMOS (October 2016) and will thereby be recognized as a potential site to be listed on the UNESCO World Heritage List. UOGSG will participate in the planning and development of this process that would elevate a major oceans region to global significance as well as including Guam and the Mariana Islands and their coastal and maritime zones. This would be a serial transboundary nomination that would include intangible cultural practices including traditional Micronesian navigation, maritime sailing, traditional ecological knowledge for fisheries, and also the historical sites of the Micronesian Stone Heritage settlements and the early Micronesian adaptation system that was settled beginning in 3500 BP.

4. Marine Protected Areas (MPAs)

There are 11 officially designated MPAs in Guam, established in 2001. Five of these areas are administered and managed by the Guam National Wildlife Refuge and the U.S. Fish & Wildlife Service. The remaining are under the purview of the Division of Aquatic and Wildlife Resources (DAWR), Guam Department of Agriculture. The preserves are zoned, multiple-use areas that prohibit resource extraction other than subsistence fishing for a limited range of 'culturally-relevant' species (goatfish, skipjacks, rabbitfish, and some surgeonfish species) using traditional gear from shore. Trolling for pelagic fish seaward of the reef margin is also permitted. Significant illegal fishing pressure is occurring in the MPAs, partly due to the emigration of Micronesian Freely Associated States citizens to Guam. Cross-cultural issues and a lack of understanding of local laws are reasons for poaching. UOGSG will work with DAWR, the Guam Bureau of Statistics and Plans (local POC for NOAA Coral Reef Conservation Program and Coastal Zone funding), and the fishing community to promote public awareness and sponsor social science and cross-cultural research into MPA management, buy-in, preservation, and adherence to rules and regulations within a multicultural island community.

5. Aquaculture Development

Shrimp hatchery, possible proofs-of-concept projects coordinating seawater air conditioning (SWAC) with algal biomass production from the return water of the Navy-private system planned for northwest Guam for the Marine military build-up facilities on Guam. This could include other uses for the seawater including energy production (from thermal conversion of cold sea water; capture of freshwater from the condensates of the chilling systems and use for hydroponics or aquifer recharge; fisheries production in the return water stream from the system). Currently, there is some stakeholder ideas in a listening session document from the Center for Tropical and Subtropical Aquaculture (2014) and the UOG's College of Natural & Applied Sciences is currently doing an economic reconnaissance of existing aquaculture businesses.

Sea Grant – August 30, 2016 Community Listening Session

University of Sea Grant Listing/Listening Session Agenda

Hyatt Guam | 9:30am - 2:30pm | August 30, 2016

- Welcome – we appreciate you being here!
- Introduce yourself and one (1) thing you are working on in one (1) minute (max) (30 mins)
- About UOG Sea Grant (Marie and Austin, 10 mins)
- The future of Sea Grant's Strategic Plan (Jim, 5 mins)
- Facilitating this meeting – meeting rules, process, and recording (Jim, 2 mins)

Q1) What are some good things that are happening on Guam from ridge-to-reef that is supporting a healthy, sustainable environment?

Q2) What are some corresponding not-so-good things (bad things) that are happening?

Q3) What issues, from Q1 or elsewhere, need some Research to be done to identify possible solutions? (S-V)

Q4) What Extension & Outreach classes/activities should be taught/done to support a healthy, sustainable environment and what audience are we trying to reach? (S-V)

Q5) What information products (factsheets, booklets, books, videos, websites) could be made that would have a SIGNIFICANT value to the people who we want to treat the environment even better? (S-V)

Q6) What volunteer efforts that support a healthy, sustainable environment could use some support of some form?

Q7) What technology can we use to deliver science-based information and communicate with clients?

Q8) What non-CNAS/UOGSG type of service or support do advocates need that would propel a healthy, sustainable environmental agenda forward? Or other last thoughts/ideas.



University of Sea Grant Listing/Listening Session Meeting Notes

Hyatt Guam | 9:30am - 2:30pm | August 30, 2016

Meeting purpose

To identify possible research, extension & outreach, and education projects that would benefit the people and environment of Guam.

Meeting attendees

- Guam Bureau of Statistics and Plans
- Guam Department of Agriculture - Forestry and Soil Resources Division
- Guam Department of Parks and Recreation
- Guam Department of Public Works
- Guam Community College
- Guam Environmental Protection Agency
- Guam Nature Alliance
- Haggan Canoe Club
- NOAA
- Northern Soil & Water Conservation District
- Office of the Governor of Guam
- Port Authority of Guam
- Southern Soil & Water Conservation District
- The Nature Conservancy, Pacific Program
- Traditions About Seafaring Islands (TASI)
- University of Guam Center for Island Sustainability
- Valley of the Latte
- Western Pacific Regional Fisheries Management Council Advisory Panel
- Guam Coastal Clean Up (International Coastal Clean Up)
- Habitat Blueprint Site – Manell Geus
- Guam SWCD Teachers Symposium
- Partnership for DOE, AYUDA, and Island Girl Power for service learning website
- Guardians of the Reef
- Restoration (Southern) urban agroforestry
- Coral reef monitoring in the Pacific region
- Active institutions and a consistent message of Ridge to Reef
- Guam Community Coral Reef Monitoring Program (1300 trained) and Eyes of the Reef
- Government of Guam climate change taskforce
- Political leaders recognizing importance of passing Southern Guam Development Master Plan and Southern Soil Erosion Council
- Community based management plan with Merizo and Yigo
- Youth for Youth summer swimming program
- Puppet shows and outreach to schools
- Wildland fire outreach and education
- Fire Wise community in Southern High School
- \$300K set aside for Western Pacific Islands in Forestry funding
- Marine conservation plan
- Marine Mania and Fish Bowl

Q1) What are some good things that are happening on Guam from ridge-to-reef that are supporting a healthy, sustainable environment?

- Guam Natural Alliance, R2R (Ridge to Reef) events

- Low impact development as part of zoning changes
- Seashore protection and flooding issue in Tumon Land – culvert did not come to fruition
- Ugum Watershed Partnership
- Federally funded climate change project vulnerability analysis at coastal base, stormwater plan updates
- Bamboo pilot removal in Merizo and UOG MBA program doing feasibility study on bamboo use
- Tåsi Beach Guides at CIS
- Guam Tropical Energy Code
- Proposed Masters program at UOG in sustainable agriculture, food, and natural resources
- Marine Preserves are generally still supported
- Fest Pac highlighted seafaring and protection of land and culture
- Guam Pig Derby now USDA Pilot for Swine Control

Q2) What are some corresponding not-so-good things (bad things) that are happening?

- Lack of enforcement of Guam laws (environmental, land use, conservation, marine)
- Lack of resources for environmental agencies
- Human-caused wildfires
- Lack of legislation to go after ship grounding
- Off-roading
- Too many roadblocks when you need to do upland restoration
- Indiscriminate land clearing - no consideration for medicinal plants
- Unenforced protection for threatened and endangered species
- Illegal dumping
- Invasive species
- A need for sustainable urban planning
- Lack of resources to deal with historical dumpsites and contaminants

- Bypass regulations
- Weak agriculture zoning
- Restricted fishing access for cultural practices
- Improper tree pruning
- Conversion of last stand of native forests
- Lack of vegetative ordinance
- Rapid loss of coral for the last 10 years
- Lack of maintenance of marine buoys
- Invasive/nuisance algae
- Lack of spatial understanding for access to near shore areas - surface part zoning/loss of public resources
- Lack of conservation officers
- Restricted access and monitoring in military restricted organizations
- Coral bleaching 2013, 2014, 2016, crown of thorns starfish
- Indiscriminate and overharvesting of marine resources
- Lack of enforcing the law
- Small percentage of locally grown produce
- Uneven enforcement of regulation
- Lack of option for solid waste, lack of recycling options
- Lack of tourist information re: marine conservation
- Lack of the styrofoam ban and trash burning
- Feral ungulates
- Lack of consideration on climate change
- Lack of invasive species action planning
- Lack of adaption plan for rising sea level
- People drowning
- Having sea walls
- Inability to reach different constituencies
- Federal regulation to conserve our natural marine services
- Lack of water education and safety in school
- Tremendous disconnect with the GovGuam in enforcing building regulations, enforcing environmental law and funding resources to execute these laws
- Trash on Guam
- Stormwater management
- Lack of green fee at the airports
- Lack of conservation and environmental

- education for migratory residents
- Can't convert statutory regulations to on-the-ground action, diminishing marine resources
- Lack of joint jurisdiction on enforcing marine legislature
- Public apathy
- Soil erosion

Q3) What issues, from Q1 or elsewhere, need some research to be done to identify possible solutions? (S-V) (straw votes of potential impact/value in brackets)

- We need to do a study on green fees, tourists, contractors, and developers - feasibility study [17]
- Nuisance algae control measures [8]
- Socioeconomic study of recurring shut down of Ugum Water Treatment Plant [4]
- Expanded research on current silt socks project and its benefits [10]
- Stormwater management [10]
- Study of producing local aquaculture feed [7]
- Safe consumption level of contaminant fish stocks [1]
- Water retention of trees [6]
- Economic modeling on effective conservation management [2]
- Value of proper tree pruning for storms to prevent damages and interrupted power [8]
- Coral propagation and out planting; how to scale it up [1]
- Sustainable agriculture in watersheds [16]
- Baseline survey in conservation areas of existing invasive plants [2]
- Feasibility of fish restocking and expansion [9]
- Effective techniques to remove invasive species [10]
- Research on the value of local wood products [3]
- Characterization of user engagement with natural resources [3]
- Stream bank and shoreline stabilization techniques [19]
- How many tourists can Guam support [9]

- Commercial and subsistence data for reef fisheries [9]
- Knowledge base of water safety of tourist [3]
- Good management practices for off-road activities [8]
- Feasibility of local ornamental plant industry [0]
- Downscale climate projection for specific niches [2]
- Listing in what causes flooding in the south [4]
- Study for effective energy storage [4]
- Study of the government law in conservation areas [16]

Q4) What Extension & Outreach classes/activities should be taught/done to support a healthy, sustainable environment; what audience(s) are we trying to reach? (S-V) (straw votes of potential impact/value in brackets)

- Storm water management on personal property [13]
- Water safety for school kids and boating safety for vendors [7]
- Conservation and management techniques for agriculture producers [13]
- Real hunters don't burn [5]
- Residential green waste management [9]
- Teaching children the value of medicinal plants [2]
- Value of ecosystem services [8]
- The value of a local diet [2]
- Sustainable practices for your Sunday BBQ [10]
- Value of our drinking water source [15]
- The problems of plastic / trash / styrofoam [8]
- Sustainable, good marine tourism reaching out to tour leaders on environmental practices [13]
- GIS course for watershed characterization [2]
- How to engage with community activism [4]

- How to identify management species on our property [14]
- Utilizing drones for conservation law enforcement [2]
- Educating students on the Chamoru name for plants and animals and biology [14]
- Household level of sustainability practices [2]
- Traditional seasonal fishing practices [10]
- Educating elected leaders on the environment protection and management [13]
- Native plant propagation techniques [6]
- Environmental stewardship for all [7]
- Proper collection for storage and disposal of household hazardous waste [0]
- Informing general public on what environmental laws are [15]
- Educate incoming military and general public on fishing regs and proper fishing techniques [3]
- More environmentally responsible / sustainable consumer choices (choosing less package healthier foods) [1]
- Environmental stewardship for all [7]
- Responsible alternates for waste disposal [12]
- Story maps of different watersheds, apps for guided trails [1]
- Cell phone dead zones [1]
- Water safety TV PSA [7]
- Translation of weather service terms [2]
- Downscale scientific information and translate into nomenclature, culture infographics on environmental services [10]
- Its the law radio ads [6]
- A list of sustainable businesses [6]
- Facebook or Instagram shaming (i.e. flicking cigarette butts) / environmental heroes [4]
- High prestigious award for GovGuam or other environmental heroes bigger than MAG PRO award [8]
- How to compost at home, do it yourself [10]
- Providing scholarships to students going into natural sciences [3]
- Smoke signals [3]
- Update the *Life on Guam* (by Lynn Raulerson) curriculum series [15]
- Movie theater anti-off road commercials [2]
- Guam curriculum for elementary and middle school for environmental matters accessible to teacher on websites [12]
- Incentive payments for conservation easements [2]
- Quick references for household waste disposal [2]

Q5) What information products (factsheets, booklets, books, videos, websites) could be made that would have a SIGNIFICANT value to the people who we want to treat the environment even better? (S-V) (straw votes of potential impact/value in brackets)

- Pocket guide data on the kinds of fish to eat (based on Monterey Bay Aquarium pocket guide) [16]
- Videos and social media [14]
- Reef etiquette in multiple languages on video [11]
- Environmental score card for elected leaders and candidates [17]
- Native plant and animal guide apps for recognizing them [14]
- Pokemon Go for native plants [2]

Q6) What volunteer efforts that support a healthy, sustainable environment could use additional support in some form?

- Guardians of the Reef (needs more high school teachers to participate; could perhaps expand outside of public schools)
- Community coral reef monitoring program needs more site coordinators, "Adopt a Reef"
- Tapping into Department of Corrections inmates to do work
- A formal reporting of way invasive species sightings
- Adopt-a-marine preserve program
- Sponsor a conservation officer

- More regulatory support, more volunteers, and programs.
- SWCD annual teachers symposium - additional support for expansion. Lesson plans will be going on website.
- Mini grants to community groups
- CNAS Charter Day support for recognizing environmental projects
- Additional partnership with media to recognize community organizations
- More financial support for environmental groups, seafarer grant
- Supporting cultural groups and connecting them to environmental activities
- Environmental summer camp program more support and expansion
- Local businesses to volunteer and clean up illegal dump site
- Environmental youth group, like the Scouts, that meet weekly
- Island Girl Power
- Utilizing church youth groups to connect with environmental issues
- Support local festivals
- Orientation on commenting on the EIS and similar engagements
- Unified campaign on Clean Green Guam, focusing on natural resources and waste management

Q7) What technology can we use to deliver science-based information and communicate with clients?

- Environmentally related email list
- Movie theater ads
- App and Youtube videos
- Interactive ads on video games
- Internet ads on Facebook and steaming platforms
- Broadcast TV announcement
- Prime time radio slot on environmental issues
- Interactive smart boards
- Online magazine of environmental issues
- Sign advertisements

- Interactive displays and advertisements (i.e. Revenue and Taxation)
- Interactive kiosk at hotels
- Videos on incoming airplanes
- Canvas approach type PSA / Door hangers
- Tagging onto the people's messages (co-sponsorship)
- QR codes for smartphones in businesses and areas.

Q8) What non-CNAS/UOGSG type of service or support do advocates need that would propel a healthy, sustainable environmental agenda forward? OR Other last thoughts/ideas.

- Quarterly updates on environmental matters
- Information sharing by different stakeholders
- Monthly meetings of natural resource stakeholders (private, government, and federal)
- Creating an Inter-group marketing campaign
- Government doesn't hold private sector with the same requirements as the military
- Engage legislators on environmental issues
- Creating integrated interactive marketing on environmental issues
- Gateways to Marine Science certification in UOG

FACILATED MEETING GROUND RULES – August 30, 2016

- Work toward solutions with your (and other's) valuable time
- You are personally responsible for:
 - self-editing; be clear and concise (1 minute MAX)
 - being engaged in this conversation
 - your comfort (let facilitator know about your needs)
 - expressing your feelings, opinions, etc. (Use "I" statements)
 - active listening
 - keep an open mind and maintaining a positive attitude. completing assignments you accept (Do what you say you will do and on time)
- Please raise your hand to speak (and avoid running dialogs)
- Everyone gets a turn first, then repeats are taken
- Keep side conversations to a minimum
- Respect all opinions and perspectives
- Conflict is OK and expected – please be gentle with each other
- Silence means agreement (speak up now!)
- Cell phones off or on silent mode, *take all calls outside*
- Humor is OK and encouraged – let's have some fun!